

AD-A193 993

COOPERATIVE EFFECTS AND INTRINSIC OPTICAL INSTABILITY
IN COLLECTIONS OF A. (U) TECHNION RESEARCH AND
DEVELOPMENT FOUNDATION LTD HAIFA (ISRAEL) Y BEN-ARIEH

1/1

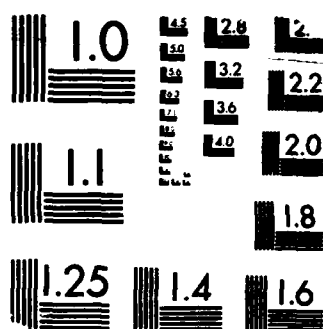
UNCLASSIFIED

31 MAR 88 R/D-5859-PH-81 DAJA45-87-C-0040

F/G 7/4

NL





MICROCOPY RESOLUTION TEST CHART
 (NBS) U.S. STANDARDS-1963-A

AD-A193 993

SECOND INTERIM REPORT TO THE US ARMY

1. Research Project: "Cooperative Effects and Intrinsic Optical Bistability in Collections of Atoms", R&D # 5859-PH-01
2. Principal Investigator: Prof. Y. Ben-Aryeh
3. Contractor: Technion Research & Foundation LTD.
4. Contract No: DAJA 45-87-C-0040
5. Second Interim Periodic Report
6. Report Period: December 1st 1987 till March 31, 1988
7. The research reported in this document has been made possible through the support and sponsorship of the U.S. Government, through its European Research Office of the U.S. Army. ~~This report is intended for the internal management use of the Contractor and the U.S. Government.~~

1

DTIC
ELECTE
APR 15 1988
S H D

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

88 4 14 060

SCIENTIFIC WORK DONE DURING THE REPORTING PERIOD

1. Resonance Fluorescence Spectra of Driven Two, Two Level Atoms

The affect of the coherent dipole-dipole interactions on the resonance fluorescence spectra of two, two-level atoms, driven by coherent external field, has been investigated. The explicit dependence of the coherent dipole-dipole interactions on the distance between the two atoms has been taken into account in the theoretical treatment of the spectra. For the case of two, two-level atoms with a fixed distance smaller than a wavelength an analytical result for the resonance fluorescence line shape has been obtained and the result has been compared with previous works.

Our work on the resonance fluorescence spectra has been accepted for publication in the Special Issue on "Quantum and Nonlinear Optics of Single Atoms, Ions and Electrons" in the Journal of Quantum Electronics (IEEE). Three copies of this article are added to the Report.

2. The Langevin Equations for Intrinsic Bistability

We have studied the effects of the Langevin noise terms on intrinsic bistability, and especially ^{are} analyzed ^{for} the case ⁱⁿ for which the dephasing constant is large relative to that of the relaxation. Within this approximation one dimensional Ito differential equation for the inversion of population has been developed. The investigation of this random differential equation is under active research. We study now the tunneling process and the passage times between the two stable states in the intrinsic bistability.

2

was studied



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <i>PHV HP</i>	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	

END

DATE

FILMED

8-88

OTIC